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EXAMINER	
HENN, TIMOTHY J	
ART UNIT	**PAPER NUMBER**
2612	

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/495,971	NETER, SARIT	
	Examiner	Art Unit	
	Timothy J. Henn	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6-10,12-23,26,28-33,35,36,39 and 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6-10,12-23,26,28-33,35,36,39 and 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 February 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 September 2005 has been entered.

Response to Arguments

2. Applicant's arguments filed 19 September 2005 have been fully considered but they are not persuasive. In the response filed Applicant argues that Hashimoto does not disclose reading from a 2x2 block of pixels simultaneously. The examiner notes that Hashimoto explicitly discloses the readout of two lines of pixels simultaneously (Figure 1; c. 3, l. 52 - c. 4, l. 19). Hashimoto further discloses that such a system removes the need for a sample-and-hold circuit (c. 3, ll. 5-12) and that in processing the R, G and B signals are simultaneously processed and are subject to almost the same time delay (c. 4, ll. 63-65). It is further disclosed that in processing, a luminance signal is formed at the YL matrix circuit 12 using the equation YN=0.30 R+0.59 G +0.11 B based on R, G and B values (c. 5, ll. 13-16). The examiner notes that if there are no delay elements in the system, the R, G and B data must be output simultaneously since they experience the same delay throughout processing and appear at the YL matrix circuit 12 at the

same time. Therefore, it can be seen that the system of Hashimoto does output a 2x2 block of pixels simultaneously (i.e. R, G and B data) as claimed.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 3, 4, 6, 12, 13-22, 26, 28, 29, 31, 33, 35, 36, 39 and 40 are rejected under 35 U.S.C. 103(a) as being anticipated by Hashimoto (US 4,768,085) in view of Roberts (5,541,654).

[claim 1]

In regard to claim 1, note that Hashimoto discloses a color imaging system for compensating a color response comprising: an array of pixel sensor elements (e.g. Figure 1); a color filter including a plurality of color filter components organized in a predefined pattern, the color filter overlaying at least a portion of the array, wherein the pixel sensor elements include at least one element associated with a first color filter component, at least one element associated with a second color component and at least one element associated with a third color component (e.g. Figure 1; c. 3, ll. 37-47); a first and second analog compensation unit coupled to at least one element associated with the first and second color filter components, respectively, the analog compensation units adapted to modify a readout of at least one element associated with the respective color component (Figure 5, Items 4 and 5; c. 4, ll. 55-59); an analog summer (i.e. summing amplifier) coupled to two elements associated with the third color filter

component and outputting an analog sum of the two elements (Figure 2, Item 2a3; Figure 5); a third analog compensation unit coupled to at least one element associated with the first and second color filter components, respectively, the analog compensation units adapted to modify a readout of at least one element associated with the respective color component (Figure 5, Item 3; c. 4, ll. 55-59); and an array controller adapted to control the readout of the elements associated with the first second and third color components (Figure 1, Item 2a1; c. 4, ll. 5-15), wherein the array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of the array (c. 3, l. 52 - c. 4, l. 28; Since there are no delay elements and the luminance signal is formed using R, G and B data, the R, G and B data must simultaneously appear that the YL matrix circuit 12, i.e. be read simultaneously). However, Hashimoto lacks readout of components in a selected window of the array while other sections of the array are not processed.

Roberts teaches the use of a windowing operation in which a subset of the array (Figure 6, Items 172 or 174) are readout independently from the rest of the array. Roberts further discloses that the rest of the array may not be read out (i.e. processed) while the window may be scanned at a frame rate much higher than if the entire array were to be read out (c. 10, ll. 9-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a windowing operation in the device of Hashimoto in order to achieve higher frame rates by reading out (i.e. processing) only a subset of the entire array. The examiner notes that Roberts discloses the use of a control circuit 32 and decoding and latching circuits 22 and 24 (c.

4, ll. 20-41).

[claim 3]

In regard to claim 3, note that Hashimoto discloses an array which is arranged in a plurality of rows and columns (e.g. Figure 1).

[claim 4]

In regard to claim 4, note that Hashimoto discloses an array controller adapted to control readout of a plurality of pixel sensor elements in parallel (c.4, ll. 5-15).

[claim 6]

In regard to claim 6, note that Hashimoto discloses analog compensation units which are gain amplifiers (c.4, ll. 55-59).

[claim 12]

In regard to claim 12, note that Hashimoto discloses color filter components including the colors of red, blue and green (Figure 1; c. 3, ll. 37-47).

[claims 13 and 14]

In regard to claims 13 and 14, Hashimoto discloses all limitations except for the interlaced or odd and even readout modes of columns and rows. However, the use of independent readout of even and odd rows or columns is well known in the art to create industry standard NTSC TV signals or to reduce the amount of data readout during for a frame when a high frame rate is more important than high resolution. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use even and odd row or column readout with the imaging system of Hashimoto to create NTSC TV signals or to reduce the resolution in order to achieve

higher frame rates.

[claim 15]

In regard to claim 15, note that Hashimoto discloses an array controller which causes a plurality of substantially simultaneous, independent readouts for a plurality of rows and some columns (c. 4, ll. 5-15).

[claims 16 and 19]

In regard to claims 16 and 19, Hashimoto discloses all limitations except for a passive CCD imaging device. However, the use of CCD imagers in cameras is well known in the art to provide higher sensitivity than other imagers, such as CMOS imagers (Official Notice). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a passive CCD imager as the imaging device of Hashimoto to achieve higher sensitivity.

[claims 17 and 18]

In regard to claims 17 and 18, Hashimoto discloses all limitations except for an active CMOS imaging sensor device. However, it is well known in the art to use active CMOS image sensors in applications where nondestructive readout of pixels is required, such as in Hashimoto (e.g. c. 3, ll. 48-52). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an active CMOS image sensor in the imaging system of Hashimoto to allow for non-destructive readout of the image sensor (Official Notice).

[claim 20]

In regard to claim 20, note that at least a first pixel sensor element of Hashimoto is associated with a different color than a second, neighboring pixel sensor element (Figure 1).

[claim 21]

In regard to claim 21, note that Hashimoto discloses all limitations except for color components organized in a Bayer color pattern. However, the use of the Bayer color pattern is well known in the art for its ability to provide a greater amount of luminance data than chrominance data in a way similar to human vision (e.g. US 3,971,065). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Bayer color filter to more closely mimic human vision (Official Notice).

[claim 22]

In regard to claim 22, note that Hashimoto discloses all limitations except for a complementary color scheme include yellow, cyan and magenta color filters. However, the use of yellow, cyan and magenta is a well known design alternative to the use of red, green and blue color filters as is well known in the art. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use yellow, cyan and magenta color filters to achieve color images (Official Notice).

[claim 26]

In regard to claim 26, note that Hashimoto discloses a method of compensating color response in an analog domain of an array of pixel sensor elements comprising: amplifying an analog output from a plurality of elements of a first color component

(Figure 5, Item 4; c. 4, ll. 55-59); amplifying an analog output from a plurality of elements of a second color component wherein two said elements outputs are summed together prior to the amplifying (Figure 5, Item 3 and (G1+G2); c. 4, ll. 55-59; c. 5, ll. 49-60); and generating a compensated analog readout of the plurality of elements of the first color component (Figure 5) , wherein a 2x2 pixel block from two adjacent columns and two adjacent rows of the array is simultaneously read (c. 3, l. 52 - c. 4, l. 28; Since there are no delay elements and the luminance signal is formed using R, G and B data, the R, G and B data must simultaneously appear that the YL matrix circuit 12, i.e. be read simultaneously). However, Hashimoto lacks readout of components in a selected window of the array while other sections of the array are not processed.

Roberts teaches the use of a windowing operation in which a subset of the array (Figure 6, Items 172 or 174) are readout independently from the rest of the array. Roberts further discloses that the rest of the array may not be read out (i.e. processed) while the window may be scanned at a frame rate much higher than if the entire array were to be read out (c. 10, ll. 9-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a windowing operation in the device of Hashimoto in order to achieve higher frame rates by reading out (i.e. processing) only a subset of the entire array. The examiner notes that Roberts discloses the use of a control circuit 32 and decoding and latching circuits 22 and 24 (c. 4, ll. 20-41).

[claim 28]

In regard to claim 28, note that Hashimoto discloses generating a compensated analog readout comprising amplifying the analog readout for the plurality of elements of the first color component with a first programmable gain amplifier (i.e. white balance amplifier; c.4, ll. 55-59; The office notes that the system of figure 5 would inherently include such a white balance controller to allow for proper white balance, even though such a controller is not depicted).

[claim 29]

In regard to claim 29, note that Hashimoto discloses white balancing the first color component (i.e. determining an optical level of color compensation for the analog readout of the plurality of elements of the first color component; c. 4; ll. 55-59).

[claim 31]

In regard to claim 31, note that the Hashimoto discloses sensor elements that are associated with the colors of red, blue and green (Figure 1; c. 3, ll. 37-47).

[claim 33]

In regard to claim 33, note that Hashimoto discloses an act of generating comprising generating a plurality of substantially simultaneous, independent readouts for the set of rows and the set of columns (c. 4, ll. 5-15).

[claim 35]

In regard to claim 35, note that Hashimoto discloses a color imaging system for compensating a color response comprising: an array of pixel sensor elements (e.g. Figure 1); a color filter including a plurality of color filter components organized in a predefined pattern, the color filter overlaying at least a portion of the array, wherein the

pixel sensor elements include at least one element associated with a first color filter component, at least one element associated with a second color component and at least one element associated with a third color component (e.g. Figure 1; c. 3, ll. 37-47); a first and second analog compensation unit coupled to at least one element associated with the first and second color filter components, respectively, the analog compensation units adapted to modify a readout of at least one element associated with the respective color component (Figure 5, Items 4 and 5; c. 4, ll. 55-59); an analog summer (i.e. summing amplifier) coupled to two elements associated with the third color filter component and outputting an analog sum of the two elements (Figure 2, Item 2a3; Figure 5); a third analog compensation unit coupled to at least one element associated with the first and second color filter components, respectively, the analog compensation units adapted to modify a readout of at least one element associated with the respective color component (Figure 5, Item 3; c. 4, ll. 55-59); and an array which selectively couples elements associated with the first, second and third colors to the first, second and third amplifiers respectively (Figure 2; Figure 5; note the individual colors connected to individual amplifiers) , wherein the array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of the array (c. 3, l. 52 - c. 4, l. 28; Since there are no delay elements and the luminance signal is formed using R, G and B data, the R, G and B data must simultaneously appear that the YL matrix circuit 12, i.e. be read simultaneously). However, Hashimoto lacks readout of components in a selected window of the array while other sections of the array are not processed.

Roberts teaches the use of a windowing operation in which a subset of the array (Figure 6, Items 172 or 174) are readout independently from the rest of the array. Roberts further discloses that the rest of the array may not be read out (i.e. processed) while the window may be scanned at a frame rate much higher than if the entire array were to be read out (c. 10, ll. 9-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a windowing operation in the device of Hashimoto in order to achieve higher frame rates by reading out (i.e. processing) only a subset of the entire array. The examiner notes that Roberts discloses the use of a control circuit 32 and decoding and latching circuits 22 and 24 (c. 4, ll. 20-41). Roberts further discloses the use of the control circuit to perform windowing by resetting and reading of pixels under variable patterns (c. 7, ll. 33-45).

[claim 36]

In regard to claim 36, note that Hashimoto discloses sensor elements arranged in rows and columns (Figure 1).

[claim 39]

In regard to claim 39, note that Hashimoto discloses a method of interpolating a color value in the analog domain in real-time, comprising: modifying a first analog signal corresponding to the output of a first pixel element in an imager to color correct the first pixel, wherein the first pixel element is used to sense light intensity of a first color (e.g. Figure 5, Item 4; c. 4, ll. 55-59); and modifying a second analog signal corresponding to the output of a second and a third pixel element in an imager to color correct the second and third pixels, wherein the second and third pixels are used to sense light intensity of

a second color and wherein the second analog signal is a sum of the second a third pixel elements (Figure 5, Item 3; c. 4, ll. 55-59; The office notes that the system of Hashimoto modifies the analog signals by white balancing them), wherein a 2x2 pixel block from two adjacent columns and two adjacent rows of the array is simultaneously read (c. 3, l. 52 - c. 4, l. 28; Since there are no delay elements and the luminance signal is formed using R, G and B data, the R, G and B data must simultaneously appear that the YL matrix circuit 12, i.e. be read simultaneously). However, Hashimoto lacks readout of components in a selected window of the array while other sections of the array are not processed.

Roberts teaches the use of a windowing operation in which a subset of the array (Figure 6, Items 172 or 174) are readout independently from the rest of the array. Roberts further discloses that the rest of the array may not be read out (i.e. processed) while the window may be scanned at a frame rate much higher than if the entire array were to be read out (c. 10, ll. 9-21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a windowing operation in the device of Hashimoto in order to achieve higher frame rates by reading out (i.e. processing) only a subset of the entire array. The examiner notes that Roberts discloses the use of a control circuit 32 and decoding and latching circuits 22 and 24 (c. 4, ll. 20-41).

[claim 40]

In regard to claim 40, note that Hashimoto discloses modifying a third analog signal corresponding to the output of a third pixel element in the imager to color correct the third pixel (Figure 5, Item 5; c. 4, ll. 55-59)

5. Claims 7, 8, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) as applied to claim 1 above, and in further view of Boisvert et al. (US 5,329,312).

[claim 7]

In regard to claim 7, note that Hashimoto discloses all limitations except for analog compensation units which are programmable gain amplifiers. Boisvert et al. teaches an improved analog signal processing system which provides white balancing with minimal dark level differences (e.g. c. 5, ll. 7-29) using separate programmable gain amplifiers for each pixel color (e.g. Figure 1; Figure 2; c. 6, ll. 14-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the programmable gain amplifiers of Boisvert et al. in the white balance system of Hashimoto to reduce the amount of dark level differences between the colors.

[claim 8]

In regard to claim 8, see claim 7.

[claim 30]

In regard to claim 30, note that Hashimoto discloses all limitations except for a compensated analog readout that depends on a temperature of the system. Boisvert et al. teaches an improved analog signal processing system which provides white

balancing with minimal dark level differences (e.g. c. 5, ll. 7-29) using separate programmable gain amplifiers for each pixel color (e.g. Figure 1; Figure 2; c. 6, ll. 14-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the programmable gain amplifiers of Boisvert et al. in the white balance system of Hashimoto to reduce the amount of dark level differences between the colors. It is further noted that the analog signal processors of Boisvert et al. are temperature compensated (i.e. the readout depends on temperature of the system; c. 13, ll. 20-24).

[claim 32]

In regard to claim 32, note that Hashimoto discloses an act of generating comprising: generating an independent readout for even numbered rows (i.e. Figure 2, Items G2 and B2); generating an independent readout for odd numbered rows (i.e. Figure 2, Items G1 and R1); generating an independent readout for even numbered columns (i.e. Figure 2, Items R1 and B2); and generating an independent readout for odd numbered columns (i.e. Figure 1, Items G1 and G2; The office notes that each of the pixel elements G1, B1, G2 and R2 are readout independently (i.e. on independent readout lines) from each other which meets the limitation of the claims (i.e. c.4, ll. 5-9)), such that at least one element associated with red, blue and green filter components are coupled to first, second and third gain amplifiers respectively (Figure 5). Therefore, it can be seen that Hashimoto lacks programmable gain amplifiers for each color component.

Boisvert et al. teaches an improved analog signal processing system which provides white balancing with minimal dark level differences (e.g. c. 5, ll. 7-29) using separate programmable gain amplifiers for each pixel color (e.g. Figure 1; Figure 2; c. 6, ll. 14-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the programmable gain amplifiers of Boisvert et al. in the white balance system of Hashimoto to reduce the amount of dark level differences between the colors.

6. Claim 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) in view of Boisvert et al. (US 5,329,312) as applied to claim 7 above, and in further view of Zhou et al. (IEEE). **[claims 9 and 10]**

In regard to claims 9 and 10 it can be seen that Boisvert et al. disclose all limitations except for programmable gain amplifiers contained within the pixel circuitry and within a plurality of column buffers. However, such a system is well known in the art, (for example see Zhou, Figures 1 and 2) as a way to reduce the overall size of imaging systems. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the design of Boisvert et al. with the gain amplifiers of Zhou contained in the pixel circuitry of the array in a plurality of column buffers to reduce the overall size.

7. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) as applied to claim 1 above, and in further Sano et al. (IEEE).

[claim 23]

In regard to claim 23, note that Hashimoto discloses all limitations except for a micro-lens layer. However, the use of micro-lens layers on image sensors is well known in the art to increase photosensitivity of the image sensor arrays, for example see Sano et al. (IEEE). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a micro-lens layer with the imaging system of Wada et al. to increase photosensitivity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571) 272-7310. The examiner can normally be reached on M-F 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ngoc Yen Vu can be reached on (571) 272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJH
1/6/2005

NGOC-YEN VU
PRIMARY EXAMINER